Safety Manual > Construction and Fire Protection

Construction and Fire Protection Requirements for Laboratory Units

The fire hazard classification allowable for each laboratory depends on the design and construction of the building in which the laboratory is housed. The construction requirements are the minimum permitted and do not exclude the use of construction with greater fire resistance. The following information is exerted from Subpart 45 of the NFPA Fire Code.

Construction And Fire Protection Requirements For Laboratory Units

Lab Unit Fire Hazard Class	Area Of Lab. Unit Square Feet	Non sprinklered Laboratory Units				Sprinklered Lab Units	
		Construction Types I and II		Construction Types III, IV, and V		Any Construction Type	
		Fire Separation from Non-Lab Areas	Fire Sep. from Lab Units of Equal or Lower Hazard Classification	Fire Separation from Non-Laboratory Areas	Fire Sep. from Lab Units of Equal or Lower Hazard Classification	Fire Sep. from Non-laboratory Areas	Fire Sep. from Lab Units of Equal or Lower Hazard Classification
Class A	Under 1000 1001-2000 2001-5000 5001-10,000 10,001 or more	One Hour One Hour Two Hour N/A N/A	One Hour One Hour One Hour N/A N/A	Two Hours N/A N/A N/A N/A	One Hour N/A N/A N/A N/A	One Hour One Hour One Hour One Hour N/A	NC;LC NC;LC NC;LC NC;LC N/A
Class B	Under 20,000 20,000 or more	One Hour N/A	NC; LC N/A	One Hour N/A	One Hour N/A	NC; LC N/A	NC; LC N/A
Class C	Under 10,000 10,000 or more	One Hour One Hour	NC; LC NC; LC	One Hour One Hour	NC; LC One Hour	NC; LC NC; LC	NC; LC NC; LC

Note: In this table N/A represents laboratory units that are not allowed under a particular construction type. For example, a Class A lab that has an area of 10,001 square feet or more is not allowed under any of the protection requirements for laboratories.

Noncombustible Material (NC). A material that, in the form in which it is used and under the conditions anticipated, will not ignite, burn, support combustion, or release flammable vapors when subjected to fire or heat. Materials are considered noncombustible if successfully tested in accordance with ASTM E 136.

Limited Combustible (LC). As applied to a building construction material, means a material;

(1) that does not comply with the definition of a noncombustible material

(2) that, in the form in which it is used, has a potential heat value not exceeding 3500 Btu per lb (8141 kJ/kg)

(3) That complies with one of the following paragraphs, (a) or (b).

(a) Materials having;

– a structural base of noncombustible material

– a surfacing not exceeding a thickness of 1/8 an inch (3.2 mm)

– surfacing with a flame spread rating equal to or less than 50

(b) Materials in the form and thickness used, other than as described in (a);

– must exhibit no evidence of continued progressive combustion

– must have a flame spread rating less than 25

– must be of such composition that surfaces exposed by cutting through the material on any plane would not have a flame spread greater than 25 or exhibit evidence of continued progressive combustion

Classification of Construction Types

Basic types of construction are Types I, II, III, IV, and V. Each basic type, except for Type IV, includes two or more subclasses differentiated by a three-digit arabic number. The arabic numbers designate the fire endurance rating requirements for certain structural elements as follows:

First Arabic Number. Exterior bearing walls.

Second Arabic Number. Structural frame or columns and girders, supporting loads for more than one floor.

Third Arabic Number. Floor construction.

Fire Resistance Requirements in hours for Type I through Type V Construction										
	Type I		Type II			Type III		Type IV	Type V	
	443	332	222	111	000	211	200	2HH	111	000
Exterior Bearing Walls Supporting more than one floor columns, or other bearing walls Supporting one floor only……. Supporting a roof only…….	4 4 4	3 3 3	2 2 1	1 1 1	0 0 0	2 2 2	2 2 2	2 2 2	**1** **1** **1**	**0** **0** **0**
Interior Bearing Walls Supporting more than one floor, columns, or other bearing walls. Supporting one floor only…….. Supporting a roof only……	4 3 3	3 2 2	2 2 1	1 1 1	0 0 0	1 **1** **1**	0 **0** **0**	2 1 1	1 1 1	0 0 0
Columns Supporting more than one floor, bearing walls, or columns…….. Supporting one floor only…….. Supporting a roof only……	4 3 3	3 2 2	2 2 1	1 1 1	0 0 0	1 **1** **1**	0 **0** **0**	H **H** **H**	1 **1** **1**	0 **0** **0**
Beams, Girders, Trusses, & Arches Supporting more than one floor, bearing walls, or columns…….. Supporting one floor only…….. Supporting a roof only……	4 3 3	3 2 2	2 2 1	1 1 1	0 0 0	1 **1** **1**	0 **0** **0**	**H** **H** **H**	1 **1** **1**	0 **0** **0**
Floor Construction	3	2	2	1	0	**1**	**0**	**H**	**1**	**0**
Roof Construction	2	1.5	1	1	0	**1**	**0**	**H**	**1**	**0**
Exterior Nonbearing Walls	0	0	0	0	0	**0**	**0**	**0**	**0**	**0**

Note: Any bold number or letter in the table is a member that is permitted to be of approved combustible material.

“H” indicates heavy timber members.